indicated that the hybrid polymer Pdots formed with a mesh-like structure, and do not have a distinct core-shell structure. This indicates that hydrolysis of the organic silane forms a silica network which interpenetrat with the semi-conducting polymers and therefore formed a hybrid inter-penetrated network.

[0243] TEM measurements were made by placing one drop of a hybrid polymer dot dispersion on a copper grid. After evaporation of the water from the dispersion, the surface was imaged using TEM (FEI Tecnai F20, 200 kV). FIG. **17** shows a representative TEM image of the PFBT-14% C_2COOH hybrid polymer dots. Notably, the magnified TEM images of the hybrid polymer dots show that the hybrid polymer dots do not have a core-shell structure or a core-cap structure. This furthermore indicates that hydrolysis of the organic silane forms a silica network, and then inside the hybrid Pdots an interpenetrated hybrid network between the silica network and the semiconducting polymer chains is formed.

[0244] While preferred embodiments of the present invention have been shown and described herein, it will be obvious to those skilled in the art that such embodiments are provided by way of example only. Numerous variations, changes, and substitutions will now occur to those skilled in the art without departing from the invention. It should be understood that various alternatives to the embodiments of the invention described herein may be employed in practicing the invention. It is intended that the following claims define the scope of the invention and that methods and structures within the scope of these claims and their equivalents be covered thereby.

What is claimed is:

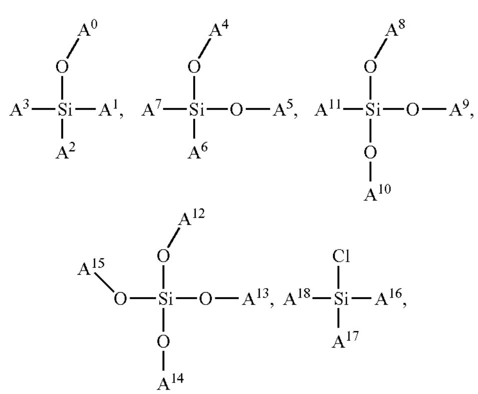
1. A method of making an organic-inorganic interpenetrated hybrid polymer dot, the method comprising:

providing a solution, wherein the solution comprises a solvent, a semiconducting chromophoric polymer, and an organo-silane; and

mixing the solution with an aqueous solution,

2. The method claim **1**, wherein at least one of the solution or the aqueous solution comprises an organo-silane comprising X, and wherein X is a functional group suitable for bioconjugation.

3. The method of claim **2**, wherein the organo-silane is selected from:



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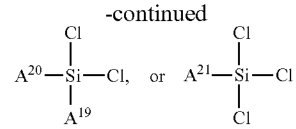
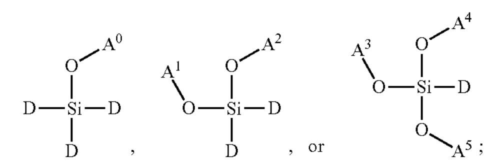


wherein:

A^1, A^2, A^3, A^6, A^7, A^{11}, A^{16}, A^{17}, A^{18}, A^{19}, A^{20}, and A^{21} are each independently C_nH_{2n+1}, $C_nH_{2n}X$, C_nF_{2n+1}, or $C_nF_{2n}X$;

A^0, A^4, A^5, A^8, A^9, A^{10}, A^{12}, A^{13}, A^{14}, and A^{15} are each independently C_mH_{2m+1}, $C_mH_{2m}X$, C_mF_{2m+1}, or $C_mF_{2m}X$.

4. The method of claim **2**, wherein the organo-silane comprising X is selected from:



wherein:

A^0, A^1, A^2, A^3, A^4, and A^5, are each independently C_mH_{2m+1}, C_mF_{2m+1}, $C_mH_{2m}X$, or $C_mF_{2m}X$;

D is LX, wherein L is a linker moiety; and

m is not less than 1.

5. The method of claim **4**, further comprising a biological molecule conjugated to D.

6. The method of claim **5**, wherein the biological molecule comprises a protein or a nucleic acid.

7. The method of claim **1**, further comprising heating the solution or the aqueous solution, or a combination thereof.

8. The method of claim **1**, wherein the aqueous solution is alkaline.

9. The method of claim **8**, wherein the aqueous solution has a pH not less than 9, or wherein the aqueous solution has a pH of not less than 10 and not greater than 11.

10. The method of claim **1**, wherein the aqueous solution has a pH of not greater than 6; a pH of not greater than 5; or a pH of not greater than 4.

11. An organic-inorganic interpenetrated hybrid chromophoric polymer dot comprising a semiconducting chromophoric polymer, an inorganic network, and a functional group that is suitable for bioconjugation.

12. The organic-inorganic interpenetrated hybrid chromophoric polymer dot of claim **11**, wherein the semiconducting chromophoric polymer comprises a plurality of units, M, selected from: